WHAT IS CLAIMED IS:

1. A robotic surgery system for performing a surgical procedure on a patient lying on an operating table within an operating room, the room having a ceiling-height support structure extending generally above the table and personnel-usable space adjacent the table, the system comprising:

a mounting base;

a surgical end effector; and

a linkage movably supporting the end effector relative to the mounting base, the linkage comprising:

a plurality of driven joints coupled to a servomechanism for moving the end effector so as to manipulate tissues;

at least one pre-configuration link; and

a plurality of releasably fixable joints coupled to the at least one pre-configuration link for pre-configuring the linkage, the releasably fixable joints accommodating vertical movement of the end effector relative to the mounting base; and

the mounting base is mountable upon the ceiling-height support structure so as to permit the linkage to be pre-configured to extend generally downward from the mounting base to support the end effector adjacent the patient.

2. The robotic surgery system of claim 1, wherein the linkage is pre-configurable to support the end effector adjacent the patient so that the at least one pre-configuration link and the plurality of releasably fixable joints of the pre-configured linkage are disposed generally clear of the personnel-usable space adjacent the operating table.

3. The robotic surgery system of claim 1, further comprising:

a brake system coupled to the fixable joints, the brake system releasably inhibiting inadvertent articulation of the fixable joints previously configured in an at least substantially fixed configuration;

wherein the brake system is biased toward the fixed configuration and the brake system comprises a brake release actuator for releasing the fixable joints to a manually repositionable configuration in which the fixable joints can be manually articulated.

4. The robotic surgery system of claim 3, wherein the fixable joints in the repositionable configuration articulate to accommodate manual translation of the end effector in three dimensions.

5. The robotic surgery system of claim 4, wherein the fixable joints in the repositionable configuration further articulate to accommodate manual rotation of the end effector about least one axis relative to the base.

6. The robotic surgery system of claim 5, wherein the linkage comprises a plurality of fixable links and a plurality of rigid driven links, the fixable links coupled together by the fixable joints, the driven links coupled together by the driven joints, wherein the fixable links are supported by the mounting base and the driven links are supported by the fixable links.

7. The robotic surgery system of claim 6, wherein the fixable links include at least one balanced, fixable, jointed-parallelogram linkage structure extending between a pair of adjacent fixable rotational joints, the jointed-parallelogram structure accommodating motion in a generally vertical direction, and the adjacent rotational joints accommodating pivotal motion about vertical axes.

8. The robotic surgery system of claim 1, wherein the robotic linkage includes a rigid shaft coupled to the end effector, and at least one of the robotic linkage, the servomechanism and a combination of the linkage and servomechanism acts to constrain the shaft to rotation about a pivot point along the shaft, and wherein actuation of the fixable joints moves the pivot point and the shaft

9. The robotic surgery system of claim 1, the linkage further comprising a joint sensor system coupling the fixable joints to the servomechanism, the sensor system generating joint configuration signals, wherein the servomechanism includes a computer and wherein the joint sensor system transmits the joint configuration signals to the computer.

10. The robotic surgery system of claim 9, wherein the computer calculates a coordinate system transformation between a reference coordinate system affixed relative to the base and the end effector using the joint configuration signals

11. The robotic surgery system of claim 10, further comprising a plurality of robotic linkages, each linkage including a plurality of joints coupled to the sensor system and supporting an associated end effector, wherein the computer calculates coordinate system

transformations between the reference coordinate system and each of the end effectors using the joint configuration signals.

12. The robotic surgery system of claim 11, wherein a joint signal of at least one of the sensors of the sensor system varies with an absolute position of the joint.

13. A support apparatus for supporting a first robotic surgical manipulator relative to a second robotic surgical manipulator, each surgical manipulator coupled to a servomechanism so as to robotically manipulate tissues of a patient body with a surgical end effector while the patient lies on an operating table within an operating room, the room having a ceiling-height support structure extending generally above the table and personnel-usable space adjacent the table, the support apparatus comprising:

a mounting base;

a first support linkage mounted to the base and movably supporting the first manipulator relative to the base, the first support linkage accommodating vertical movement of the first manipulator relative to the mounting base;

the base is mountable upon the ceiling-height support structure so as to permit the first support linkage to be pre-configured to extend generally downward from the base to support the first manipulator adjacent the patient;

a second support linkage supporting the second manipulator relative to the base; and

a sensor system coupling the first and second support linkages to the servomechanism, the sensor system transmitting position signals to the servomechanism, the servomechanism calculating at least one of a position and an orientation of the first manipulator relative to the second manipulator using the signals.

14. The support apparatus of claim 13, wherein the first support linkage is pre-configurable to support the first manipulator adjacent the patient so that the pre-configured linkage is disposed generally clear of the personnel-usable space adjacent the operating table.

15. The support apparatus of claim 13, wherein the first support linkage comprises:

an articulated linkage having a plurality of releasably fixable joints coupling the base to the first manipulator so as to allow manual movement of the first manipulator relative to the base for pre-configuring the linkage, and

a brake system releasably inhibiting inadvertent movement of the joints, wherein the sensor system is coupled to the joints so that the position signals comprise joint configuration signals of the joints.

16. The support apparatus of claim 15, wherein the brake system is biased toward the fixed configuration and the brake system comprises a brake release actuator for releasing the fixable joints to a manually repositionable configuration in which the fixable joints can be manually articulated.

17. The support apparatus of claim 16, wherein the brake system can release the joints upon actuation of a single actuator.

18. The support apparatus of claim 17, wherein the joints articulate to accommodate manual translation of the manipulator and handle in three dimensions.

19. The support apparatus of claim 18, wherein the joints further articulate to accommodate manual rotation of an end effector coupled to the first manipulator about at least one axis relative to the base.

20. The support apparatus of claim 15, wherein the first support linkage is balanced about the joints

21. The support apparatus of claim 15, wherein the first support linkage includes at least one balanced, fixable, jointed-parallelogram linkage structure extending between a pair of adjacent fixable rotational joints, the jointed-parallelogram structure accommodating motion in a generally vertical direction, and the adjacent rotational joints accommodating pivotal motion about vertical axes.

22. A method for preparing for robotic surgery on a patient lying on an operating table within an operating room, the room having a ceiling-height support structure extending generally above the table and personnel-usable space adjacent the table, the surgery employing a surgical manipulator having servo-mechanically driven joints, the method comprising:

maintaining driven joints of the surgical manipulator sufficiently near mid points of travel of the joints so as to inhibit interference with a limit of travel of the manipulator within an intended worksite;

pre-positioning the manipulator while maintaining the driven joints near the mid points by manually articulating a linkage coupled to the manipulator and to a mounting base, the linkage accommodating vertical movement of the manipulator relative to the mounting base, and the base being mounted upon the ceiling-height support structure so that the pre-positioned linkage to extends generally downward from the base to support the manipulator adjacent the patient; and

restraining the positioned manipulator with a brake system so as to prevent articulation of the linkage.

23. The method of claim 22, wherein the pre-positioning step comprises pre-positioning the linkage so that the pre-positioned linkage is disposed generally clear of the personnel-usable space adjacent the operating table.

24. The method of claim 22, wherein the pre-positioning step comprises orienting a manipulator shaft towards an internal access site, the manipulator being adapted to pivot the shaft about the access site so as to manipulate tissues endoscopically.

25. A robotic surgery system for performing a surgical procedure on a patient lying on an operating table within an operating room, the room having a support structure extending generally below the table and personnel-usable space adjacent the table, the system comprising:

a base;

a surgical end effector; and

a linkage movably supporting the end effector relative to the base, the linkage comprising:

a plurality of driven joints coupled to a servomechanism for moving the end effector so as to manipulate tissues;

at least one pre-configuration link; and

a plurality of releasably fixable joints coupled to the at least one pre-configuration link for pre-configuring the linkage, the releasably fixable joints accommodating vertical movement of the end effector relative to the base; and

the base is mountable upon the support structure so as to permit the linkage to be pre-configured to extend generally upward from the base to support the end effector adjacent the patient.

26. The robotic surgery system of claim 25, wherein the linkage is pre-configurable to support the end effector adjacent the patient so that the at least one pre-configuration link and the plurality of releasably fixable joints of the pre-configured linkage are disposed generally clear of the personnel-usable space adjacent the operating table.

27. The robotic surgery system of claim 25, further comprising:

a brake system coupled to the fixable joints, the brake system releasably inhibiting inadvertent articulation of the fixable joints previously configured in an at least substantially fixed configuration;

wherein the brake system is biased toward the fixed configuration and the brake system comprises a brake release actuator for releasing the fixable joints to a manually repositionable configuration in which the fixable joints can be manually articulated.

28. The robotic surgery system of claim 27, wherein the fixable joints in the repositionable configuration articulate to accommodate manual translation of the end effector in three dimensions.

29. The robotic surgery system of claim 28, wherein the fixable joints in the repositionable configuration further articulate to accommodate manual rotation of the end effector about least one axis relative to the base.

30. The robotic surgery system of claim 29, wherein the linkage comprises a plurality of fixable links and a plurality of rigid driven links, the fixable links coupled together by the fixable joints, the driven links coupled together by the driven joints, wherein the fixable links are supported by the mounting base and the driven links are supported by the fixable links.

31. The robotic surgery system of claim 30, wherein the fixable links include at least one balanced, fixable, jointed-parallelogram linkage structure extending between a pair of adjacent fixable rotational joints, the jointed-parallelogram structure accommodating motion in a generally vertical direction, and the adjacent rotational joints accommodating pivotal motion about vertical axes.

32. The robotic surgery system of claim 25, wherein the robotic linkage includes a rigid shaft coupled to the end effector, and at least one of the robotic linkage, the servomechanism and a combination of the linkage and servomechanism acts to constrain the shaft to rotation about a pivot point along the shaft, and wherein actuation of the fixable joints moves the pivot point and the shaft.

33. The robotic surgery system of claim 25, the linkage further comprising a joint sensor system coupling the fixable joints to the servomechanism, the sensor system generating joint configuration signals, wherein the servomechanism includes a computer and wherein the joint sensor system transmits the joint configuration signals to the computer.

34. The robotic surgery system of claim 33, wherein the computer calculates a coordinate system transformation between a reference coordinate system affixed relative to the base and the end effector using the joint configuration signals

35. The robotic surgery system of claim 34, further comprising a plurality of robotic linkages, each linkage including a plurality of joints coupled to the sensor system and supporting an associated end effector, wherein the computer calculates coordinate system transformations between the reference coordinate system and each of the end effectors using the joint configuration signals.

36. The robotic surgery system of claim 35, wherein a joint signal of at least one of the sensors of the sensor system varies with an absolute position of the joint.

37. A support apparatus for supporting a first robotic surgical manipulator relative to a second robotic surgical manipulator, each surgical manipulator coupled to a servomechanism so as to robotically manipulate tissues of a patient body with a surgical end effector while the patient lies on an operating table within an operating room, the room having a support structure extending generally below the table and personnel-usable space adjacent the table, the support apparatus comprising:

a base;

a first support linkage mounted to the base and movably supporting the first manipulator relative to the base, the first support linkage accommodating vertical movement of the first manipulator relative to the base;

the base is mountable upon the support structure so as to permit the first support linkage to be pre-configured to extend generally upward from the base to support the first manipulator adjacent the patient;

a second support linkage supporting the second manipulator relative to the base; and

a sensor system coupling the first and second support linkages to the servomechanism, the sensor system transmitting position signals to the servomechanism, the servomechanism calculating at least one of a position and an orientation of the first manipulator relative to the second manipulator using the signals.

38. The support apparatus of claim 37, wherein the first support linkage is pre-configurable to support the first manipulator adjacent the patient so that the pre-configured linkage is disposed generally clear of the personnel-usable space adjacent the operating table.

39. The support apparatus of claim 37, wherein the first support linkage comprises:

an articulated linkage having a plurality of releasably fixable joints coupling the base to the first manipulator so as to allow manual movement of the first manipulator relative to the base for pre-configuring the linkage, and

a brake system releasably inhibiting inadvertent movement of the joints, wherein the sensor system is coupled to the joints so that the position signals comprise joint configuration signals of the joints.

40. The support apparatus of claim 39, wherein the brake system is biased toward the fixed configuration and the brake system comprises a brake release actuator for releasing the fixable joints to a manually repositionable configuration in which the fixable joints can be manually articulated.

41. The support apparatus of claim 40, wherein the brake system can release the joints upon actuation of a single actuator.

42. The support apparatus of claim 41, wherein the joints articulate to accommodate manual translation of the manipulator and handle in three dimensions.

43. The support apparatus of claim 42, wherein the joints further articulate to accommodate manual rotation of an end effector coupled to the first manipulator about at least one axis relative to the base.

44. The support apparatus of claim 39, wherein the first support linkage is balanced about the joints

45. The support apparatus of claim 39, wherein the first support linkage includes at least one balanced, fixable, jointed-parallelogram linkage structure extending between a pair of adjacent fixable rotational joints, the jointed-parallelogram structure accommodating motion in a generally vertical direction, and the adjacent rotational joints accommodating pivotal motion about vertical axes.

46. A method for preparing for robotic surgery on a patient lying on an operating table within an operating room, the room having a support structure extending generally below the table and personnel-usable space adjacent the table, the surgery employing a surgical manipulator having servo-mechanically driven joints, the method comprising:

maintaining driven joints of the surgical manipulator sufficiently near mid points of travel of the joints so as to inhibit interference with a limit of travel of the manipulator within an intended worksite;

pre-positioning the manipulator while maintaining the driven joints near the mid points by manually articulating a linkage coupled to the manipulator and to a mounting base, the linkage accommodating vertical movement of the manipulator relative to the mounting base, and the base being mounted upon the support structure so that the pre-positioned linkage to extends generally upward from the base to support the manipulator adjacent the patient; and

restraining the positioned manipulator with a brake system so as to prevent articulation of the linkage.

47. A robotic surgery system for performing a surgical procedure on a patient lying on an operating table within an operating room, the room having personnel-usable space adjacent the table, having a ceiling-height support structure extending generally above the table and having a below-table support structure extending generally below the table, the system comprising:

at least one ceiling-height-mounted robotic arm assembly comprising:

a first base;

a first surgical manipulator coupled to an first end effector;

a first linkage including a plurality of releasably fixable joints for pre-configuring the first linkage, the releasably fixable joints accommodating vertical movement of the first manipulator relative to the first base; and

the first base is mountable upon the ceiling-height support structure so as to permit the first linkage to be pre-configured to extend generally downward from the first base to support the first end effector adjacent the patient; and

at least one below-table-mounted robotic arm assembly comprising:

a second base;

a second surgical manipulator coupled to an second end effector;

a second linkage including a plurality of releasably fixable joints for pre-configuring the second linkage, the releasably fixable joints accommodating vertical movement of the second manipulator relative to the second base; and

the second base is mountable upon the below table support structure so as to permit the second linkage to be pre-configured to extend generally upward from the second base to support the second end effector adjacent the patient.

48. The robotic surgery system of claim 47, wherein the first and second linkages are pre-configurable to support the first and second end effectors adjacent the patient so that the at least one ceiling-height-mounted robotic arm assembly and the at least one below-table-mounted robotic arm assembly are disposed generally clear of the personnel-usable space adjacent the operating table.

49. The robotic surgery system of claim 48, wherein at least one of the ceiling-height-mounted robotic arm assembly and the below-table-mounted robotic arm assembly further comprises:

a brake system coupled to the fixable joints, the brake system releasably inhibiting inadvertent articulation of the fixable joints previously configured in an at least substantially fixed configuration;

wherein the brake system is biased toward the fixed configuration and the brake system comprises a brake release actuator for releasing the fixable joints to a manually repositionable configuration in which the fixable joints can be manually articulated.

50. The robotic surgery system of claim 49, wherein the at least one ceiling-height-mounted robotic arm assembly and the at least one below-table-mounted robotic arm assembly include:

at least a total of four robotic arm assemblies operatively controllable by a single operator, wherein at least one of the manipulator-supported end effectors is an endoscopic image capture device.

51. The robotic surgery system of claim 49, wherein the at least one ceiling-height-mounted robotic arm assembly and the at least one below-table-mounted robotic arm assembly include:

at least four robotic arm assemblies, wherein at least one of the manipulator-supported end effectors being an endoscopic image capture device, at least one of the robotic arm assemblies being simultaneously operatively controllable by a different operator than at least one of the other robotic arm assemblies.

52. The robotic surgery system of claim 51, wherein the robotic arm assemblies include:

at least three robotic arm assemblies which are operatively controllable by a first operator; and

at least three robotic arm assemblies which are simultaneously operatively controllable by a second operator.